

DOCUMENTATION OF ENVIRONMENTAL INDICATOR DETERMINATION
Interim Final 2/5/99
RCRA Corrective Action
Environmental Indicator (EI) RCRIS code (CA725)

Current Human Exposures Under Control

Facility Name: Solutia, Inc. - Chocolate Bayou Plant
Facility Address: P.O. Box 711, Alvin, Texas 77512-0711
Facility EPA ID#: TXD001700806

1. Has all available relevant/significant information on known and reasonably suspected releases to soil, groundwater, surface water/sediments, and air, subject to RCRA Corrective Action (e.g., from Solid Waste Management Units (SWMU), Regulated Units (RU), and Areas of Concern (AOC)), been considered in this EI determination?
- X If yes - check here and continue with #2 below.
 If no - re-evaluate existing data, or
 if data are not available skip to #6 and enter "IN" (more information needed) status code.

BACKGROUND

Definition of Environmental Indicators (for the RCRA Corrective Action)

Environmental Indicators (EI) are measures being used by the RCRA Corrective Action program to go beyond programmatic activity measures (e.g., reports received and approved, etc.) to track changes in the quality of the environment. The two EI developed to-date indicate the quality of the environment in relation to current human exposures to contamination and the migration of contaminated groundwater. An EI for non-human (ecological) receptors is intended to be developed in the future.

Definition of "Current Human Exposures Under Control" EI

A positive "Current Human Exposures Under Control" EI determination ("YE" status code) indicates that there are no "unacceptable" human exposures to "contamination" (i.e., contaminants in concentrations in excess of appropriate risk-based levels) that can be reasonably expected under current land- and groundwater-use conditions (for all "contamination" subject to RCRA corrective action at or from the identified facility (i.e., site-wide)).

Relationship of EI to Final Remedies

While Final remedies remain the long-term objective of the RCRA Corrective Action program the EI are near-term objectives which are currently being used as Program measures for the Government Performance and Results Act of 1993, GPRA). The "Current Human Exposures Under Control" EI are for reasonably expected human exposures under current land- and groundwater-use conditions ONLY, and do not consider potential future land- or groundwater-use conditions or ecological receptors. The RCRA Corrective Action program's overall mission to protect human health and the environment requires that Final remedies address these issues (i.e., potential future human exposure scenarios, future land and groundwater uses, and ecological receptors).

Duration / Applicability of EI Determinations

EI Determinations status codes should remain in RCRIS national database ONLY as long as they remain true (i.e., RCRIS status codes must be changed when the regulatory authorities become aware of contrary information).

Facility Information

The Solutia Chocolate Bayou facility is located on road FM 2917, approximately 11 miles southeast of the city of Alvin in Brazoria County, Texas. The central portion of the Solutia Chocolate Bayou facility includes the areas of the active plant operations which involve the manufacture of chemical feedstocks and intermediates. The area to the south of the manufacturing area encompasses the Solid Waste Management Area and the Injection Well Pretreatment Facility (IWPF). This area is comprised of eight Solid Waste Management Units (SWMUs) (i.e. Units A, B, C, D, E, I, and 02). Unit J is located in the central portion of the facility (GSI, 2002a).

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2. Are groundwater, soil, surface water, sediments, or air media known or reasonably suspected to be **“contaminated”**¹ above appropriately protective risk-based “levels” (applicable promulgated standards, as well as other appropriate standards, guidelines, guidance, or criteria) from releases subject to RCRA Corrective Action (from SWMUs, RUs or AOCs)?

	<u>Yes</u>	<u>No</u>	<u>?</u>	<u>Rationale / Key Contaminants</u>
Groundwater	<u>X</u>	_____	_____	<u>Plumes stable or controlled / VOC and SVOC</u>
Air (indoors) ²	_____	<u>X</u>	_____	<u>No structures over affected sites</u>
Surface Soil (e.g., <2 ft)	<u>X</u>	_____	_____	<u>Under cover and/or MSC / VOC and SVOC</u>
Surface Water	_____	<u>X</u>	_____	<u>No Impact to surface waters</u>
Sediment	_____	<u>X</u>	_____	<u>No Impact to sediments</u>
Subsurf. Soil (e.g., >2 ft)	<u>X</u>	_____	_____	<u>Under cover and/or <MSC / VOC and SVOC</u>
Air (outdoors)	_____	<u>X</u>	_____	<u>Under cover and/or <MSC, no impact to air</u>

_____ If no (for all media) - skip to #6, and enter “YE,” status code after providing or citing appropriate “levels,” and referencing sufficient supporting documentation demonstrating that these “levels” are not exceeded.

X If yes (for any media) - continue after identifying key contaminants in each “contaminated” medium, citing appropriate “levels” (or provide an explanation for the determination that the medium could pose an unacceptable risk), and referencing supporting documentation.

_____ If unknown (for any media) - skip to #6 and enter “IN” status code.

Rationale and Reference(s):

Solid Waste Management Units (SWMUs): Site Investigations have been completed at SWMUs A, B, C, D, E, I, J, and 02. The “no further action” recommendation for SWMUs B, D, and E has been approved by the TCEQ based on the original RFI report (GSI, 1992b) and the verification groundwater sampling report (GSI, 1996f). Groundwater impacts were detected at SWMUs A, C, I, J, and 02. As an Interim measure, NAPL has been recovered in the units where present, i.e., SWMUs A, I, 02, and J (GSI, 1999a; 2002b), and natural attenuation investigations and modeling have been conducted in order to demonstrate plume stability (GSI, 1996a, b, c, d; 1997b, c; 1998; 2002b). These data demonstrate that there is no offsite migration of affected groundwater. Soil covers of varying thickness were placed on the SWMUs at the time of closure (GSI, 1992a, b). The baseline risk assessment (BLRA) submitted to the TCEQ on June 25, 2002 (GSI, 2002a) indicated that, due to interim control measures implemented at the units (i.e., surface cover, groundwater use restrictions, and monitored natural attenuation), no human exposures to affected soil or groundwater presently occur at these SWMUs. The CMS for these SWMUs will be completed upon receipt of final approval for the BLRA from the TCEQ.

Injection Well Pretreatment Facility (IWPF): The closure and final capping of the former IWPF surface impoundments was completed in 1997. A groundwater corrective action program, involving hydraulic control and affected groundwater recovery, was conducted at this SWMU from 1995 to 2000 (GSI, 1997a). Natural attenuation investigations and groundwater modeling have demonstrated that the IWPF groundwater plume is stable or shrinking (GSI, 1996c, d, 1999b). Therefore, no onsite or offsite impact of potential receptors is expected.

Footnotes:

¹ “Contamination” and “contaminated” describes media containing contaminants (in any form, NAPL and/or dissolved, vapors, or solids, that are subject to RCRA) in concentrations in excess of appropriately protective risk-based “levels” (for the media, that identify risks within the acceptable risk range).

² Recent evidence (from the Colorado Dept. of Public Health and Environment, and others) suggest that unacceptable indoor air concentrations are more common in structures above groundwater with volatile contaminants than previously believed. This is a rapidly developing field and reviewers are encouraged to look to the latest guidance for the appropriate methods and scale of demonstration necessary to be reasonably certain that indoor air (in structures located above (and adjacent to) groundwater with volatile contaminants) does not present unacceptable risks.

References

- GSI, 1992a. "Final Report RCRA Facility Investigation (RFI) for Units A, I, J, and 02, Monsanto Company, Alvin, Texas." Groundwater Services, Inc., GSI Job No. G-1256, June 19, 1992.
- GSI, 1992b. "Final Report RCRA Facility Investigation (RFI) for Units B, C, D, and E, Monsanto Company, Alvin, Texas." Groundwater Services, Inc., GSI Job No. G-1256, August 14, 1992.
- GSI, 1996a. "Phenol Unit Area Corrective Action Program, Voluntary Corrective Action Program, Monsanto Company, Alvin, Texas." Groundwater Services, Inc., GSI Job No. G-1880, July 31, 1996.
- GSI, 1996b. "Groundwater Sampling and Testing in Support of Natural Attenuation, Phenol Unit Area, Monsanto Chocolate Bayou Plant, Alvin, Texas." Groundwater Services, Inc., GSI Job No. G-1822, August 9, 1996.
- GSI, 1996c. "Plant-Wide Groundwater Modeling Study, Monsanto Chocolate Bayou Plant, Alvin, Texas." Groundwater Services, Inc., Houston, Texas, GSI Job No. G-1780, August 16, 1996.
- GSI, 1996d. "Groundwater Sampling and Testing in Support of Natural Attenuation, Southern Plant Area, Monsanto Chocolate Bayou Plant, Alvin, Texas." Groundwater Services, Inc., Houston, Texas GSI Job No. G-1824, December 11, 1996.
- GSI, 1996e. "Final Report Supplemental (Phase II) RCRA Facility Investigation RFI Units A and C, Monsanto Company, Alvin, Texas." Groundwater Services, Inc., GSI Job No. G-1858, October 18, 1996.
- GSI, 1996f. "Final Report Verification Groundwater Sampling Program RCRA Facility Investigation RFI Units B, D, and E, Monsanto Company, Alvin, Texas." Groundwater Services, Inc., GSI Job No. G-1858, August 16, 1996.
- GSI, 1997a. "RCRA Permit Renewal Application, Monsanto RCRA Permit HW-50189-001, Alvin, Texas." Groundwater Services, Inc., Houston, Texas, GSI Job No. G-1878, April 1, 1997.
- GSI, 1997b. "BIOSCREEN Natural Attenuation Modeling for RFI Units 02, A, and C, Solutia Chocolate Bayou Plant, Alvin, Texas." Groundwater Services, Inc., Houston, Texas, GSI Job No. G-2014, October 3, 1997.
- GSI, 1997c. "Groundwater Sampling and Testing in Support of Natural Attenuation, RFI Units A and C, Solutia Chocolate Bayou Plant, Alvin, Texas." Groundwater Services, Inc., Houston, Texas GSI Job No. G-2015, October 3, 1997.
- GSI, 1998. "Groundwater Sampling and Testing in Support of Natural Attenuation, RFI Units A, C, I, and 02, Solutia Chocolate Bayou Plant, Alvin, Texas." Groundwater Services, Inc., Houston, Texas, GSI Job No. G-2167, October 23, 1998.
- GSI, 1999a. "Non-Aqueous Phase Liquid Recovery and Monitoring, RFI Units A, I, and 02, Solutia Chocolate Bayou Plant, Alvin, Texas." Groundwater Services, Inc., Houston, Texas GSI Job No. G-2166, September 8, 1999.
- GSI, 1999b. "Natural Attenuation Investigation, IWPF Corrective Action Program, Solutia Chocolate Bayou Facility, Alvin, Texas." Groundwater Services, Inc., Houston, Texas, GSI Job No. G-2307, September 22, 1999.
- GSI, 2001a. "Units A and C Supplemental 2001 RCRA Facility Investigation, Solutia, Inc., Alvin, Texas." Groundwater Services, Inc., Houston, Texas, GSI Job No. G-2521, April 16, 2001.
- GSI, 2001b. "Statistical Evaluation of Groundwater Data, Phenol Unit Corrective Action Program, Solutia Chocolate Bayou Plant, Alvin, Texas." Groundwater Services, Inc., GSI Job No. G-2576, June 1, 2002.
- GSI, 2002a. "Baseline Risk Assessment, Units A, C, I, J, and 02, Solutia Chocolate Bayou Facility, Alvin, Texas." Groundwater Services, Inc., Houston, Texas, GSI Job No. G-2625, June 25, 2002. (This report contains references for the annual reports being prepared for the Phenol Unit Corrective Action area, which overlaps the Unit J corrective action program).
- GSI, 2002b. "Annual Report: July 2002, Voluntary Corrective Action Program for Manufacturing Facilities, Solutia Chocolate Bayou Plant, Alvin, Texas." Groundwater Services, Inc., Houston, Texas, GSI Job No. G-2667, July 25, 2002. (This report contains references for the annual reports being prepared for the Phenol Unit Corrective Action area, which overlaps the Unit J corrective action program).

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3. Are there complete pathways between “contamination” and human receptors such that exposures can be reasonably expected under the current (land- and groundwater-use) conditions?

Summary Exposure Pathway Evaluation Table

“Contaminated” Media	Potential Human Receptors (Under Current Conditions)						
	Residents	Workers	Day-Care	Construction	Trespassers	Recreation	Food ³
Groundwater	no	no*	no	no	no	no	no
Air (indoors)	_____						
Soil (surface, e.g., <2 ft)	no	no*		no	no	no	no
Surface Water	_____						no
Sediment	_____						
Soil (subsurface e.g., >2 ft)	no	no*		no	no	no	no
Air (outdoors)	_____						

***Note:** No current exposure due to soil cover, absence of groundwater use, etc., per Item No. 2 above. Workers represent potential receptors only if current controls are removed.

Instructions for Summary Exposure Pathway Evaluation Table:

1. Strike-out specific Media including Human Receptors’ spaces for Media which are not “contaminated”) as identified in #2 above.
2. enter “yes” or “no” for potential “completeness” under each “Contaminated” Media -- Human Receptor combination (Pathway).

Note: In order to focus the evaluation to the most probable combinations some potential “Contaminated” Media - Human Receptor combinations (Pathways) do not have check spaces (“_____”). While these combinations may not be probable in most situations they may be possible in some settings and should be added as necessary.

- X If no (pathways are not complete for any contaminated media-receptor combination) - skip to #6, and enter “YE” status code, after explaining and/or referencing condition(s) in-place, whether natural or man-made, preventing a complete exposure pathway from each contaminated medium (e.g., use optional Pathway Evaluation Work Sheet to analyze major pathways).
- _____ If yes (pathways are complete for any “Contaminated” Media - Human Receptor combination) - continue after providing supporting explanation.
- _____ If unknown (for any “Contaminated” Media - Human Receptor combination) - skip to #6 and enter “IN” status code

Rationale and Reference(s):

The IWPF site and the SWMUs are located within the Chocolate Bayou Plant area, at a minimum of 800 feet from the facility boundary. Groundwater investigations indicate that the plumes at the IWPF site and SWMUs A, C, I, J, and 02 are stable or shrinking; consequently, there is no apparent potential for offsite impact (GSI, 1996a, b, c, d; 1997b, c; 1998; 1999b; 2002a, b). There are no drinking wells onsite. Affected soils are covered or capped, and workers are restricted from working in affected areas. Therefore, per the BLRA, Solutia’s in-place controls prevent worker exposure (GSI, 2002a).

³ Indirect Pathway/Receptor (e.g., vegetables, fruits, crops, meat and dairy products, fish, shellfish, etc.)

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- 4 Can the exposures from any of the complete pathways identified in #3 be reasonably expected to be “significant”⁴ (i.e., potentially “unacceptable” because exposures can be reasonably expected to be: 1) greater in magnitude (intensity, frequency and/or duration) than assumed in the derivation of the acceptable “levels” (used to identify the “contamination”); or 2) the combination of exposure magnitude (perhaps even though low) and contaminant concentrations (which may be substantially above the acceptable “levels”) could result in greater than acceptable risks)?

Not Applicable

- _____ If no (exposures can not be reasonably expected to be significant (i.e., potentially “unacceptable”) for any complete exposure pathway) - skip to #6 and enter “YE” status code after explaining and/or referencing documentation justifying why the exposures (from each of the complete pathways) to “contamination” (identified in #3) are not expected to be “significant.”
- _____ If yes (exposures could be reasonably expected to be “significant” (i.e., potentially “unacceptable”) for any complete exposure pathway) - continue after providing a description (of each potentially “unacceptable” exposure pathway) and explaining and/or referencing documentation justifying why the exposures (from each of the remaining complete pathways) to “contamination” (identified in #3) are not expected to be “significant.”
- _____ If unknown (for any complete pathway) - skip to #6 and enter “IN” status code

Rationale and Reference(s):

Not Applicable

⁴ If there is any question on whether the identified exposures are “significant” (i.e., potentially “unacceptable”) consult a human health Risk Assessment specialist with appropriate education, training and experience.

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5 Can the “significant” exposures (identified in #4) be shown to be within acceptable limits?

Not Applicable

- If yes (all “significant” exposures have been shown to be within acceptable limits) - continue and enter “YE” after summarizing and referencing documentation justifying why all “significant” exposures to “contamination” are within acceptable limits (e.g., a site-specific Human Health Risk Assessment).
- If no (there are current exposures that can be reasonably expected to be “unacceptable”)- continue and enter “NO” status code after providing a description of each potentially “unacceptable” exposure.
- If unknown (for any potentially “unacceptable” exposure) - continue and enter “IN” status code

Rationale and Reference(s):

Not Applicable

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6. Check the appropriate RCRIS status codes for the Current Human Exposures Under Control EI event code (CA725), and obtain Supervisor (or appropriate Manager) signature and date on the EI determination below (and attach appropriate supporting documentation as well as a map of the facility):

X YE - Yes, "Current Human Exposures Under Control" has been verified. Based on a review of the information contained in this EI Determination, "Current Human Exposures" are expected to be "Under Control" at the Solutia, Inc. - Chocolate Bayou facility, EPA ID # TXD001700806, located at Alvin, Texas under current and reasonably expected conditions. This determination will be re-evaluated when the Agency/State becomes aware of significant changes at the facility.

____ NO - "Current Human Exposures" are NOT "Under Control."

____ IN - More information is needed to make a determination.

Completed by _____
Douglas Crist
Project Manager

Date 2/26/2003

Supervisor _____
Phyllis Primrose
Supervisor
Texas Commission on Environmental Quality

Date _____

Locations where References may be found:

TCEQ Central Files and/or Solutia Chocolate Bayou Plant Files.

Contact telephone and e-mail numbers

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FINAL NOTE: THE HUMAN EXPOSURES EI IS A QUALITATIVE SCREENING OF EXPOSURES AND THE DETERMINATIONS WITHIN THIS DOCUMENT SHOULD NOT BE USED AS THE SOLE BASIS FOR RESTRICTING THE SCOPE OF MORE DETAILED (E.G., SITE-SPECIFIC) ASSESSMENTS OF RISK.

